Personal Air Vehicles

East Richland High School
1200 East Laurel Street
Olney, IL 62450

Student: Nicole Tillery
nicoledesi86@yahoo.com

Teacher: Lisa Pampe
lpampe@east.rchlnd.k12.il.us

Johnny Johnson wakes up three hours before his first class starts at High School High in Anycity, USA. Johnny must get up early because his daily commute to high school takes over an hour and a half. Within thirty minutes of waking up, he is on the road in his new car. Within one block of his house, he must stop and wait because of high levels of traffic. As he moves along in his car, he travels a distance of a quarter of a mile in twenty minutes. People walking on the sidewalk are moving faster than he is. Johnny is unfortunate--his school is just far enough away that he cannot make the trip by foot. Finally, almost two hours after he first got into his car, he arrives at his school. After driving through the crowded parking lot for ten minutes, he finds an available parking spot, almost a full block from his school. By the time Johnny walks into the school and visits his locker, he is already late for his first period class. If only Johnny had a quicker way to school. If only Johnny was not confined to the crowded highways of the ground. In only a few years Johnny may have such a way to school. Personal Air Vehciles (PAVs) are currently being developed by the National Aeronautics and Space Administration (NASA) and other instititutions. These vehicles will allow Johnny to get to school on time. The Personal Air Vehciles will offer an easier way of travel.

Though PAVs are still in the development process, different aspects of the vehicles have already been decided. These PAVs will be small aircrafts holding two to four people. They will be able to use side streets in cities for door-to-door travel. Other types of PAVs will be able to fly from small airport to small airport, needing only a few hundred feet to take off (Anthony). These PAVs would not be large aircrafts or the small, slow automobiles of today. These PAVs have an estimated speed of around 100 or 200 mph ("Futuristic"). Because any air travel requires training, the PAVs will include an automatic piloting computer system which will use GPS and other systems to pilot for the passengers (Noor and Venneri). Therefore, no one will be needed to actually manually operate the vehicle. New technology will be developed which will monitor both internal and external changes for the PAV (Noor and Venneri). PAV users will no longer need an extensive knowledge of their machine to be able to operate it or detect any malfunctions within the system. Auto upkeep will be simple. PAVs will be the car of the future.

Two majors problems exist with PAVs: who will operate the machine and where will it fly. NASA is currently developing solutions including a computerized brain and air traffic controls. According to Helene Zampetakis, a new type of software is being developed that will be a sort of brain for the machines. This computer will be able to respond to changes in the aircraft. It will be able to consider other drivers in the area and changes in the weather. The computer will also monitor any technical failures within the machine and compensate. With this computer, anyone will be able to drive a PAV. No training will be necessary. Also, because technology is able to make alterations using the computer, the PAV will not requrie as much basic upkeep as current automobiles or aircraft. The PAV will not require a trip to the local mechanic every time something goes wrong within the machine. For the highway conern, according to Zampetakis, NASA is working on a highway system that will control and monitor air traffic. Global positioning as well as broadband satellites will be used to know the exact location of every single PAV in use. While this may not be new technology, it is a new way to use the technology. The technology is currently being used in mordern cars as navigational systems, informing the driver how to get from point A to point B. The GPS is used as little more than a map. In the PAVs, the GPS system will be used by the computer to actually fly the vehicle. Because the GPS systems will also be aware of the locations of other vehicles both on the air and on the ground, it will allow the computer to pilot the brain without colliding with other vehicles. In addition, because one system is operating all

vehicles, fewer accidents will occur. Solutions to these problems are already being considered and developed.

Along with a new vehicle and means of transportation comes a new type of society. With an automated pilot system, public transportation will become easier and less expensive. In large cities, buses and subway systems will no longer need a driver but a computer system. Also, because of these computer systems, anyone can fly. Currently, a person must be at least sixteen years of age to operate a vehicle. According to Randall Parker, young people will use their PAVs alone. They will no longer need a capable driver to escort them around town. In addition, people will become more independent, no matter what age. Designated drivers will no longer be necessary. Drunk drivers will cease to exist. Automated drivers will ensure that everyone makes it home safely, even if that person had a little too much to drink. With automated drivers, the experience or capabilities of the person behind the wheel is irrelevant because that person is not driving, the computer is. Therefore, driver ignorance and incapabilities will cause fewer accidents. Also, because of PAVs, there will no longer be a strict divide between urban and rural areas (Anothony). Because of the PAVs, people will still be able to live in rural areas and quickly travel to urban areas. A person will work in a large city and be able to live in a small town hundreds of miles away. The PAV will decrease the commute time immensely. People living and working in small towns will still have the benefit of urban lifestyles. For example, a family living in Southern Illinois with only a Wal-Mart store for shopping will not have to depend on that store only. Instead, using a PAV, that family can travel to St. Louis or Chicago for shopping in a matter of minutes. Rural and urban areas will no longer be two distinct entities. However, PAVs will create a stronger divide between the mobile and immobile. Currently, people of any economic class can afford a car. A rusty car with over two-hundred thousand miles on its odometer will still be able to travel to the same extent as a brand-new Mercedes. With PAVs, the people who are able to afford these vehicles will have greater means of mobility than those who are unable to afford them. PAVs will create a new social atomosphere.

Of course, scientists are not depending on one type of PAV to carry the future, but are developing different types of PAVs. NASA, along with Homeland Security and the Federal Aviation Administration, is developing three particular types. The Mid-term Gridlock Commuter Aircraft is the least expensive of the three, estimated to cost a mere $50,000 (“Futuristic”). That price is comparable to the cost of new automobiles on the market today. In addition, the machine is fuel-efficient and quiet. The price alone makes it a suitable vehicle for middle-class homes. However, of NASAs three vehicles, it is the slowest, traveling at only 150 mph; however, the machine can only hold up to two people (“Futuristic”). The machine will be ideal for someone who lived in the suburbs and worked in the city. Able to travel on side streets, the Mid-term can be used anywhere. Current aircraft requires runways and large airports. A Mid-term will be used in cities and suburbs. A Mid-term will only need 500 feet to take of and to land (“Futuristic”). Therefore, someone with a Mid-term could land almost anywhere, though public places like malls or stadiums will have to have designated areas for taking off and landing. Only seating two people, the Mid-term car will not be a family car. It will be an aircraft meant for quick travel.

Another PAV being considered, the Near-term Next Generation Geral Aviation Aircraft is comparable to a modern sport utitlity vehicle (SUV) . Costing about $100,000, the Near-term costs twice as much as the Mid-term, not unlike the price of an SUV compared to the price of a compact car (“Futuristic”). Seating four people, the Near-term will be used for traveling families. Able to fly at 200 mph, the vehicle will provide quick transportation for family family trips which used to take hours travelling to the destination (“Futuristic”). Neart-term must use General Aviation

airfields, located across the country in 10,000 differeent spots (“Futuristic”). While families will not be able to travel around town in the vehicle, they will be able to go to Grandmas house in an afternoon, a trip which used to take hours on the road. In addition, while the Near-term is not quite as fuel-efficient as the Mid-term, it does not consume gas to the extent that current aircraft does. The Near-term manages 25 mpg (“Futuristic”). Again, the Near-terms fuel consumption is comparable to that of a modern SUV. Plenty of Americans are willing to spend the extra money on fuel for their SUV, judging by the popularity of those types of automobiles on the road today. Therefore, they will also be willing to spend the extra money on fuel for the PAV. Because of Near-term vehicles, more people will be able to travel greater distances. A trip across the country will no longer require months of planning, expensive plane tickets, or uncomfortable hours in the car. Such a trip will only require a PAV and a few free hours. The Near-term will be the "SUV" of future generations.

Today, congestion of traffic is a major problem in travel. Though congestion is mainly a problem in urban areas, it also extends to smaller cities and towns. By 2012, congestion levels of these smaller cities and towns are expected to reach the current levels of large cities (“Urban Mobility”). According to Joseph Anthony, congestion is increasing to the point that people will eventually stop driving because they cannot get anywhere. Even today, in cities like New York City, people prefer to walk rather than drive. The streets are just too crowded. In the past twenty years, the daily time a person spends waiting in traffic has tripled, indicating a dramatic increase in traffic congestion (“Urban Mobility”). In 2002, people in cities of populations around three million were experiencing around one hundred hours of traffic delay a year (“Urban Mobility”). As population increases and more people begin to drive, traffic congestion will only increase as well. In 2002 alone, over sixty billion dollars were spent due to used time and fuel during traffic delays (“Urban Mobility”). As fuel becomes more precious and expensive, people in larger cities are wasting more of it because of traffic congestion. Building more roadways, a common solution to the congestion problem, does not work most of the time. Cities have to build more roadways at the same rate that their population grows. Most cities are unable to accomplish this feat (“Urban Mobility”). Therefore, there is no current, feasible solution to the highway congestion problem. However, PAVs will not use highways or roads. Traffic congestion will decrease. While automobiles will still be used, the entire population, particularly in large cities, will not be confined to the ground. People will take to the sky, providing more space for drivers. In the sky, traffic can be divided into different levels. Airways will be stacked on top of each other, providing several more spaces for cars where on the ground there would only be one. Thus, traffic congestion will decrease dramatically with PAVs.

PAVs may become common in the future, but their current designs have yet to be perfected. One major problem with the PAVs is developing the technology. PAVs would require technology which will not only check itself for malfunctions but also alter itself to different situations. Such technology does not yet exist (Noor and Venneri). Also, PAVs will not be unlike an airplane in regards to operating. The PAVs will require training and a basic understanding of a machine, more so than current automobiles would. Scientists offer a remedy for the problem with an automatic pilot system in the new vehicles (Noor and Venneri). Again, a new technology will have to be developed. This new technology will control the vehicle, and no drivers will be needed. The PAVs will operate using the computer. Therefore, any technical gliches will result in the complete breakdown of the vehicle. Also, the vehicles use the GPS system. If there is any problem within that system, then all PAVs will be competely useless, unable to go anywhere, and the automatic pilot will be unable to pilot. According to Ahmed Noor and Samuel Venneri, one solution will be

to incorporate into the system a device which would allow the driver to control the vehicle instead of the computer system if there is any malfunction within the system. However, few people will be properly trained to fly such a machine. Because of the computerized system, no one will need to be trained. By the time PAVs are in use, fewer people will be properly educated. If no one can fly a PAV, then a device enabling the passenger to control the machine will be obsolete. Also, if the system does malfunction, the PAV will perform improperly, resulting in vehicle accidents. Currently, most vehicular accidents are minor, and there are few injuries. However, these accidents are on the ground. With PAVs, these accidents will occur several miles in the air. If there is a collision, passengers will not only have to survive the accident but also the fall to the ground. With PAVs, passengers will not be able to walk away from the accident unharmed. Seatbelts and air bags will do no good plummeting hundreds of feet. Also, PAVs will decrease the country's reliance on automobiles and airplanes. This will destroy several companies, creating thousands of unemployed citizens. This decrease in use of automobiles will also contribute to the divide between those with PAVs and those without. Also, by depending on PAVs, other vehicles, like cars, will become less prevelant. If the GPS system would malfunction for any amount of time, all PAVs would become useless. However, there will no longer be enough cars to meet the demand--they will be abandoned when the PAVs arrive. Therefore, a very-mobile society will suddenly become immobile. They will not even be able to travel via automobiles. In addition, current problems with automobiles, including fuel consumption, traffic congestion, air pollution, safety, and driver ignorance, can only worsen with PAVs, according to some critics (Reeves). While PAVs are still in the developing stage, critics are already finding flaws in the system.

While PAVs are being questioned for future technology, any new form of transportation is necessary. Current transportation options are slowly becoming obsolete as population grows and the need for commuting increases. In the past ten years, the average daily travel distance has increased eight times ("NASA"). As people travel more, a quicker way of travel will be needed. PAVs will be that technology, traveling faster than an vehicle on the market today. Most daily travel is less than twenty-five miles in distance, with automobiles being used for nearly one-hundred percent of these miles ("NASA"). Therefore, airlines cannot be used for daily use--people just are not traveling far enough. PAVs could be used in this daily travel, decreasing the populations reliance on automobiles. Also, as population increases, experience decreases. In 2002, more than half of the current trained aerospace workforce was near retirement age, while the number of college students exploring these fields has declined for the past decade (Noor and Venneri). Aviation requires educated workers to expand and operate the machines. Without people working towards aviation goals, the field will decline in a time when, with increases in both travel and population, it should be growing. However, a dramatic change in the industry, like the introduction of PAVs, will increase interest in the field. As travel continues within society, a new technology becomes increasingly necessary.

The PAVs will offer the general public a new way to travel. As population and travel increases, mainly on land, so does road congestion. According to Paul Reeves, PAVs would not only reduce road congestion, but also the number of roads needed. Because PAVs will not require thousands of miles of roads and highways, government funding will not have to go towards road construction but other public needs. Also, people will be able to travel more. People can commute more in a day than they ever could before. Workers can live in rural areas, then travel via PAVs into cities hundreds of miles away (Anthony). Men and women will no longer have to sacrifice lifestyles for their careers. Also concerning careers, PAVs will create several new jobs. With the new PAV technology, more scientists will be needed. New companies will begin to emerge as

PAV manufacturers. Most important, though, PAVs will make travel easier. Randall Parker believes that with PAVs, anyone, the young, old, or invalid, will be able to operate a PAV with its automated system. A pilot will no longer be needed for air travel. Travel will become more common because people can travel independently--they no longer need someone to chauffeur them. Also, these PAVs do not require the use of large, noisy airports (Anthony). Instead, they require smaller airports. Today, airport security is a major issue. Peole traveling via airlines usually spend hours going through security and boarding procedures. With PAVs, no boarding procedures are necessary, and security is not a concern. People will no longer spend hours in the airport, waiting for their flight or their turn in line (Anthony). Also, there are not enough airports in the country for a person to be able to travel anywhere in the United States through airlines. Even getting to some larger cities may require lay-overs. Travelers have to fly whenever the airport is offering a flight to that destination. With PAVs, a traveler could fly whenever, wherever. The travelers will be able to fly alone, not with one hundred other passengers. Flying by air will become more convenient. Thus, more people will be willing to fly. Modern airports will no longer be needed. The large amounts of land taken up by these airport will be used for other services. The PAVs do not require miles of highways and roads either. When PAVs become popular, these roads and highways can be taken down in some areas. The country will have more land to put to better use. The country will no longer be comprised of large expanses of concrete and yellow paint. Also, the PAVs can take people to remote places (Reeves). Currently, there must be a large local airport or plenty of accessible roads for any location to be reached. Rental cars and airplane tickets are needed for a trip. With PAVs, all a person needs is a vehicle. The PAV, some capable of landing on any strip of land, will allow travelers to go anywhere, anytime. They will not need a runway to land or a road to take them there. Traveling will become more about exploring and adventure than following a map. PAVs will allow travelers more options and more excitement. PAVs will forever change travel.

In a future with PAVs, travel will be easier. In just thirty years or so, Johnny Johnson's grandson, Jimmy Johnson, wakes up for school just an hour before his first class begins. By the time he has gotten ready for school and grabbed a quick bite to eat, he only has thirty minutes to arrive at his high school. Unlike his grandfather, Jimmy's high school is not just a few miles away. His high school is in the next town, over forty miles away. His parents enrolled him in that school because they preferred the academic structure and curriculum of it compared to schools in Jimmy's own town. Though Jimmy only has thirty minutes to travel forty miles, he is not worried. He jumps into his Mid-term Gridlock Commuter Aircraft. He starts the vehicles, initiating the automatic pilot system. As the machine flies itself onto the airway, Jimmy sits back in his seat and works on the homework he had put off the night before. Just a few minutes later, the vehicle arrives at the high school parking lot. It automatically goes to the landing strip designated for students. The vehicle lands, piloting itself to an available parking space. The machine shuts itself off. Jimmy grabs his school things and leaves the automobile. He still has fifteen minutes until he has to be in his first class--just enough time to talk with his teacher about his Physics project.

Works Cited

"2004 Urban Mobility Report." Texas Transport Institute. 13 March 2005 <http://mobility.tamu.edu/ums/report/>.

Anthony, Joseph. "Flying Car." Joseph Anthony Radio. 13 March 2005 <http//www.josephanthonyradio.com/talk-radio-flying-car.php>.

"Futuristic Scenario: New Transportation Choices in 2030." 22 February 2005. 13 March 2005 <http://avst.larc.nasa.gov/competitions_high.html>.

"NASA Investigates Future Gridlock Commuter Personal Air Vehicles for Intra-Urban Missions." 22 February 2005. 13 March 2005 <http://avst.larc.nasa.gov/downloads/PAVE%20Gridlock.pdf>.

Noor, Ahmed K. and Samuel L. Venneri. "Plenty of Room in the Air." Mechanical Engineering. November 2002. 13 March 2005 <http://www.memagazine.org/backissues/nov02/features/plentyrm/plentyrm.html>.

Parker, Randall. "George Jetson Personal Air Vehicle Will Fly In 21st Century." Future Pundit. 22 December 2003. 13 March 2005 <http://www.futurepundit.com/archives/001863.html>.

Reeves, Paul. "Whatever Happened to the Flying Car?" Spiked. 23 June 2004. 13 March 2005 <http://www.spiked-online.com/Printable/0000000CA5A1.htm>.

Zampetakis, Helene. "Message from the Future." MIS. 2005. 13 March 2005 <http://www.misweb.com/magarticle.asp?doc_id=24111&rgid=2&listed_months=0>.